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ABSTRACT

Since the "Kangan Report" (1974), literacy and numeracy (L&N) issues have become an integral component of policy development in Australia's vocational education and training (VET) sector. Debate in the literature is based on competing discourses: functional-economic and social practice. These discourses and globalization of the economy have had a significant impact on shaping L&N policy, resulting in a proliferation of policy initiatives. L&N have moved from being marginalized to being a mainstream component of policy. Through initiatives such as competition in VET, user choice, and training packages, the training reform agenda has led to new roles for VET teachers. Impact of low levels of L&N on VET participation is largely unmeasured and based on anecdotal evidence. A lack of measures or measurement systems limits the ability to quantify it. Numerous approaches effectively support the L&N component of learner activities, but perhaps the most critical is early identification of skill levels. Professional development and teacher education programs have a role in developing L&N support mechanisms and need to focus on recognition of needs, cross-cultural training, technology use, and enhancement of research skills. An effective balance between a focus on the L&N specialist and the VET content specialist is required in the overall approach. Future research directions include workplace insights, policy examination, and participation conceptualization and measurement. (Contains 170 references.) (YLB)

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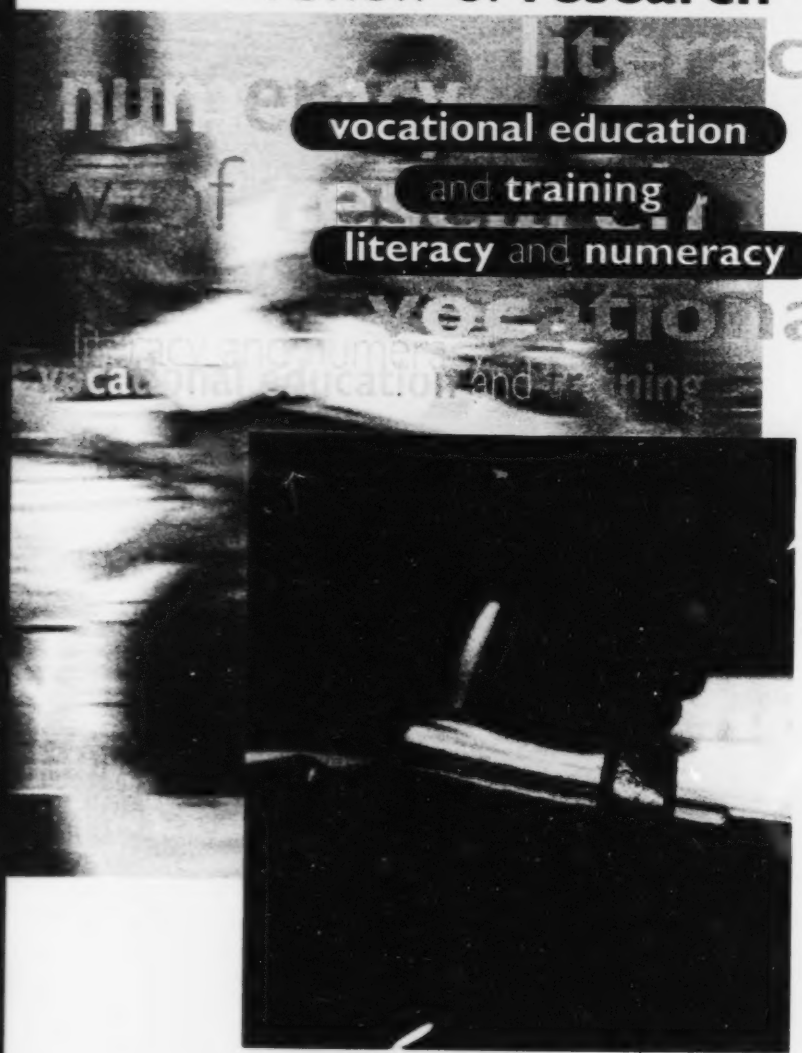

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executive **summary**

This is a review of recent literature focussed on literacy and numeracy within vocational education and training (VET). Since the pivotal Kangan report (1974), literacy and numeracy issues have become an integral component of policy development in the VET sector.

Debate in the literature is based on an array of competing discourses that can be categorised as functional-economic discourse and a social practice discourse, often seen as diametrically opposed constructs. These discourses and the globalisation of the economy have had a significant impact on the shaping of literacy and numeracy policy, resulting in a proliferation of policy initiatives over the last two decades.

Literacy and numeracy have moved from being marginalised to being a mainstream component of policy. The training reform agenda, through such initiatives as competition in VET, user choice and training packages, has led to emerging new roles for VET teachers. The integration of literacy and numeracy into mainstream delivery has resulted in a blurring of roles between the literacy and numeracy specialists and VET content specialists. Uncertainty about these roles has been further exacerbated by the development of work-based training.

The impact of low levels of literacy and numeracy on participation in VET is largely unmeasured and based on anecdotal evidence. A lack of clear measures or measurement systems limits the ability to quantify this impact. Current systems do not readily flag literacy and numeracy issues, with difficulties often being masked by absence, attrition or failure. In the absence of reliable data there appears to be a loose coupling between perceptions of problems and possible solutions. While the presence of a solution intimates some barrier to success, it is unclear as to the exact nature of the barrier and therefore the effectiveness of solutioning mechanisms.

Barriers to participation in workplace training include perceptions and relationships between literacy and numeracy, training requirements, job

requirements, self-disclosure and gender. Barriers to participation in off-site VET include selection and identification, disclosure and environment, support mechanisms and delivery methods along with marginalised groupings. Barriers to participation in the adult and community education sector include learner support mechanisms, ancillary support mechanisms and course and classroom characteristics.

While there are numerous approaches to effectively support the literacy numeracy component of learner activities, perhaps the most critical is the early identification of skill levels. Professional development and teacher education programs both have a role to play in developing literacy and numeracy support mechanisms. Such development programs need to include a focus on recognition of needs, cross-cultural training, technology use and the enhancement of research skills. An effective balance between a focus on the literacy and numeracy specialist and the VET content specialist is required in the overall approach.

Future directions for research include workplace insights, policy examination, and participation conceptualisation and measurement. It is evident that consistent and effective measurement devices are required to further promote the use of quantitative methodologies. Qualitative research into participant perceptions is also needed.

Literacy and numeracy issues will continue to be a focal point for policy development. With stronger links between research and policy development, providers will be able to better support the needs of literacy and numeracy clients in the vocational education and training sectors.

introduction

Reviewing literacy and numeracy research is a substantial task. Not only is there an extensive body of national and international research, there is also a significant amount of highly localised and contextualised research. In addition to the main body of research, the topics of literacy and numeracy cut across many other broad fields of research. References to the issues covered by this review appear in literature focussed on a vast array of loosely related subjects. For this reason, any review will only reflect a significant sample of the complete body of research.

The focus of this review is on literacy and numeracy. The dominant approach is to integrate literacy and numeracy as a single entity. The assumption is that literacy and numeracy cannot be separated, since mathematical tasks are entrenched in language (Fegent 1995). Examination of texts in a variety of subject areas highlights the extent of mathematical content and concepts embedded within the literature (Chapman & Lee 1990). A combination of numeracy and literacy skills is required to make sense of the information and as such they cannot be isolated from one another. Lee (1995) and Lee, Chapman and Röe (1994) have examined the pedagogical relationship between literacy and numeracy. They support the view that numeracy is imbricated within language. There is a 'complex embedding, overlapping, intrication and patterning of constituent components within a larger whole' (Lee 1995, p.49).

The National Framework of Adult English Language, Literacy and Numeracy Competence supports the relationship between literacy and numeracy. While the literacy and numeracy connection is pedagogically sound (Gleeson 1995), numeracy tends to be subsumed by literacy, undervalued in the partnership, and receive more limited examination. The literature that is jointly labelled rarely makes specific mention of numeracy as a separate entity or as a partner. This review continues this tradition, but questions whether numeracy requires more substantial attention in the literacy and numeracy debates. As Wallace (1995 p.57) notes 'numeracy is too often the forgotten element'.

literacy and numeracy **policy initiatives** 1970–1999

While the issue of literacy and numeracy is a perennial concern of governments, its relevance to the VET sector in Australia has only been highlighted since 1974. Prior to this, primary and secondary schools were seen as the appropriate institutions responsible for the development of literacy and numeracy standards as part of a general education. The Kangan report (ACOTAFE 1974) focussed attention on literacy and numeracy as a part of a broader equity issue and recommended the development of programs within the VET sector to address barriers to participation. Since this time, the issue of literacy and numeracy has become entrenched in VET policy development.

The Kangan report (1974) recognised the existence of barriers to participation in VET, recommended the merging of general and vocational education principles in VET and specifically noted the need for the development of general education programs in the new technical and further education system, focussing on the literacy needs of groups identified as disadvantaged (Fleming 1994; Goozee 1993; Schofield 1994). Units specialising in the provision of literacy services were developed in many States as a result of this report (Kell 1998).

The Kangan report marks the development of the struggle between two positions in vocational education and training which are mirrored in the literature on literacy and numeracy (Schofield 1994). The Kangan report strongly advocated a humanist perspective on education, viewing the role of TAFE as serving an educational and social purpose rather than simply serving a labour market function. This was challenged by subsequent economic developments and the influence of economic rationalism. An understanding of the duelling ideologies that dominate the literacy and numeracy research is important before considering the global economic factors impacting on policy development. The way in which definitions of literacy and numeracy are constructed impact on policy

development and proposals and reflect the dominant discourses adopted (Lankshear 1998).

literacy and numeracy **definitions**: discourses

Attempts to propose any single definition of literacy and numeracy are relatively futile. The terms *literate* and *literacy* do not have a single, autonomous, universally accepted definition (Searle 1999; Wagner 1994). Instead, the literature is based on particular discourses of literacy. A discourse is 'a set of conventions which to a significant extent govern what can be said' (McLaren cited in Beazley 1997, p.320). It enables the construction of reality in set ways, based on the values and assumptions of the speaker or writer. It conveys ideology. Consequently, in the words of Gee (cited in Searle 1999, p.1) 'literacy is a socially contested term'.

The range of discourses that have dominated and continue to dominate discussions of literacy have been identified and discussed by many authors (Beazley 1997; Campbell & Wilson 1999; Freebody 1997; Lankshear 1998; Sanguinetti 1998; 1999; Searle 1999; Somerville 1997; Wickert 1998). They identify orientations to literacy focussing on: power and control, socio/cultural meaning, deficit and retardation, social justice/action/practice, technology, technical and practical purposes, human capital, economic rationalism, managerialism, instrumentalism and crisis.

While each label captures a highly specific view of literacy, it is possible to identify two groups of discourses that dominate the literature and within each of these discourses to identify definitions that have been central to public debates and policy formation. The grouping of discourses is a vehicle with which to examine the controversies and contentions that are central to debate about literacy and numeracy. The terms utilised will be 'functional-economic' and 'social practice'. Street (cited in Searle 1999) refers to similar concepts as 'functional views' and 'conscientisation'.

functional-economic discourse

Discourses focussing on the economic imperatives include views of literacy as practical, technical, related to skills-based approaches to achieve narrow, specified outcomes (Searle 1999). Freebody and Gilbert (1999, p.147) believe that this discourse has seen literacy education 'recast into resources, commodities or

investments that enhance the accountable value of the human resource'. This view appears to dominate the policy developments of the late 1980s and 1990s. It is a position strongly associated with the introduction of the training reform agenda, representing a break from the traditions of the Kangan report (Schofield 1994). It is a discourse strongly associated with workplace learning and workplace literacy research. Somerville (1997) suggests that the discourse is accepted uncritically by people involved directly in workplace training. The definition of literacy provided by the Australian Language and Literacy Policy is noted as an example of this discourse:

> *the ability to read and use written information and to write appropriately, in a range of contexts. It (literacy) is used to develop knowledge and understanding, to achieve personal growth and to function effectively in our society. Literacy also includes the recognition of numbers and basic mathematical signs and symbols within text. Literacy involves the integration of speaking, listening and critical thinking with reading and writing. Effective literacy is intrinsically purposeful, flexible and dynamic and continues to develop throughout an individual's lifetime.*
>
> (DEET 1991, p.9)

The Australian Language and Literacy Policy is the first Commonwealth Government effort to formulate a comprehensive and cohesive policy aimed at defining literacy, establishing a policy position in Australian society and other policy frameworks and prescribing intervention strategies (Beazley 1997). Numeracy is subsumed within this definition, and other similar definitions. The definition utilised in the *Aspects of literacy* survey by the Australian Bureau of Statistics encompasses both numeracy and language (Department of Vocational Education and Training 1998).

Critics of the Australian Language and Literacy Policy definition encapsulate criticisms of the broader discourse. The definition has been viewed as simplistic, implying a uni-dimensional and unitary concept (Beazley 1997; Street cited in Searle 1999). It emphasises technical processes, linked to production, alienates literacy from people, contexts, relationships, is utilitarian and relies on measurable/ quantifiable educational and economic terms (Beazley 1997; Gee & Lankshear 1997). McCulloch (1997, p.64) describes such notions of literacy as 'truncated' and 'detached from humanist values'. A positive literacy outcome, when using this discourse will see literacy clients as 'normalised', 'remediated' or 'cured' (Searle 1999).

social practice discourse

An alternative paradigm, extensively used in research, is to view literacy as a socially constructed practice. This discourse, which some see as diametrically positioned to the functional-economic discourse, emphasises the role of ideology in the production of text. Literacy, from this position, is socially constructed and contextualised (Freebody & Gilbert 1999).

Literacy, as social discourse, is defined by Farrell (1998, p.4) to be:

> *Practices that constitute and are constituted by, the economic, cultural and political contexts in which they occur. 'Literacies' and literacy education, then, are by definition always local and always particular, always working in concert with issues of identity, power and access in particular institutions, communities and cultures. It is in these local sites that particular literacy practices come to 'count' and 'matter', taking on value and power in local fields of exchange.*

Farrell's definition emphasises the multi-dimensional element of literacy or 'literacies'. This is supported by Kress (cited in Freebody 1997, p.9), who maintains:

> *It is a normal and absolutely fundamental characteristic of language and of literacy to be constantly remade in relation to the needs of the moment; it is neither autonomous nor stable, and nor is it a single integrated phenomenon; it is messy and diverse.*

Searle, Smith and Cochrane (1996) support the concept of multiple literacies, especially in the workplace. The work setting requires prior knowledge of content, context and strategies to appropriately select schemas for understanding.

The concept of literacies introduces the idea that literacy can be examined, not only into separate dimensions, but that different types of literacies exist and emerge. Information literacies and technology literacies are examples that go beyond the immediate scope of this review (Watson & Harrison 1998a).

There has been strong interplay and contention between these discourses in areas other than literacy and numeracy research. An examination of the global context and a review of significant literacy and numeracy policy developments will illustrate the interplay and opposition between these factors.

the **impact** of **globalisation** on literacy and numeracy **policy** in Australia

Australia faced increasing economic difficulties from the mid 1970s, which included rising international debt, trade deficits, inflation, falling living standards and high unemployment (Smith & Keating 1997; White 1989). These problems highlighted the need for Australia's economy to be more competitive in a global market. It was believed that this could only be achieved with improved national productivity, the introduction of new technologies and new forms of work organisation. According to Goozee (1993, p.102):

> *This led to a new appreciation of the importance of human resources and skill to national economic performance as Australia would require a flexible and highly skilled workforce in order to be able to maximise productivity, produce quality goods and exploit new technologies and market opportunities.*

International competition and free trade increased, adding pressure for Australia to review the education and training system. McIntyre and Solomon (1999, p.3) argue that 'globalisation now subjects all nation-states to the imperative of making their education and training systems responsive to the needs of the national economy transformed by economic globalisation'. Various OECD reports positioned Australia globally as compared to other OECD countries and provided a broad understanding of factors influencing the quality of education (Centre for Educational Research and Innovation, OECD 1992; OECD 1995). Although not directly comparable between countries due to a variety of social, economic and cultural differences, education indicators used in the reports inform national policy development and impart a global perspective (Centre for Educational Research 1992). On both a local and global level, factors such as privatisation and deregulation within industry have contributed to changed employment patterns, mismatches between skills and work, social dislocation, and mismatches between demand for education and provision (International Labour Organisation 1995). Gonczi (1992, p.9) believes that 'new forms of work organisation and more highly skilled workforces are needed for enterprises to be competitive in these new markets'. This has influenced the development of workplace learning as a tool for organisational change (Hager 1998). Freebody and Gilbert (1999) suggest that the workplace context has been central to policy debate in Australia.

The changed economic circumstances in Australia have provided the impetus for educational change, impacting specifically on the provision of literacy and numeracy services (Kell 1998). Globalisation has prompted the inclusion of new literacies or multiliteracies as suggested by the New London Group (1997). Cope and Kalantzis (1997) highlight two significant changes that the term 'multiliteracies' encompasses including the growing significance of cultural and linguistic diversity and the impact of new communications technology. The introduction of the term multiliteracies impacts on constructions of literacy and how it is understood and used. The global environment incorporates the use of information technology to deliver services at new sites, changes in industry and workplaces and included expanded views of culture. Adult literacy services are now 'characterised by significant integration with the restructuring of Australian industry and workplaces' (Kell 1998, p.235).

Since the 1980s there has been a continuous effort to improve literacy and numeracy policy initiatives to meet the demands of the changing economic and social situation. Lo Bianco (1998) and Kell (1998) provide illuminating reviews of these policy developments. Some of the milestones of policy development that they highlight are:

- The Kirby labour market programs in 1985 saw literacy training become a component of labour market programs for youth and equity target groups and traineeships.
- The development of a National Policy on Languages in 1987 was the first explicit language policy. While Australia had been moving in the direction of a national policy since 1984, with the release of the document *Towards a national policy*, it was not until 1987 that the first language policy was released. The policy, however, was not in tune with the priorities of the government of the time (Lo Bianco 1998).
- International Year of Literacy 1990 saw the development of national and State councils and the emergence of literacy as an economic issue.
- The Australian Language and Literacy Policy of 1991 provided a national framework for the provision of literacy services in Australia. It was intended to establish policy directions for the 1990s (Beazley 1997).
- The National Collaborative Australian English Language and Literacy Strategy (1993) provided an implementation strategy for the Australian Language and Literacy Policy by integrating literacy into vocational

education, competencies and the development of pathways for students involved in language and literacy programs.

- The 1993 report on incorporating English language and literacy competencies into industry standards recognised the importance of language and literacy within the workplace.
- The National Training Framework, which emerged from the training reform agenda, linked literacy and numeracy within the Australian Recognition Framework and training packages.
- The National Reporting System recognised that the growth in provision of language and literacy services made a standardised reporting system necessary to allow common understanding and interpretation of achievement and performance amongst service providers. While the value of such an instrument is recognised by Kell (1998, p.242) he suggests that the system is 'yet to achieve its potential'.
- Lo Bianco (1998) is currently developing a draft of a further policy statement on literacy and numeracy, a *National literacy policy for Australia.*

The current policy has evolved from this background. Economic and social and political forces continue to shape policy development. The most recent policy initiatives, such as the introduction of training packages, have provided a new pinnacle of integration of language and literacy within vocational education and training. The position of literacy and numeracy in the training market, the roles of teachers (specialists, generalists and workplace trainers), the impact of the training reform agenda, and the introduction of competition continue to be significant issues in literacy and numeracy policy debate. Some of these issues are the focus of research projects in progress. Greater understanding of the impact of these policies will be gained from the conclusion of these projects.

literacy and numeracy: marginalised or mainstreamed?

Since the Kangan report, literacy has been tagged as an access and equity issue that has continued to receive a high profile in policy. The current national strategy outlined in *A bridge to the future* (Australian National Training Authority [ANTA] 1998a) and the companion volume *Equitable outcomes* (ANTA 1998b) continues to include literacy and numeracy in this way. In the past, the identification of literacy and numeracy as access and equity issues has resulted in literacy and numeracy being marginalised. However, the current policy position has resulted in the mainstreaming of literacy and numeracy (Kell 1998; Searle 1999).

In the past, a lack of research data enabled Australia to perceive that difficulties with literacy and numeracy were issues impacting on only a minority of Australians. Recent research has suggested that inadequate levels of literacy and numeracy are issues for a far greater number of people than previously predicted (Australian Bureau of Statistics[ABS] 1997a, 1997b; Wickert 1998). The literacy and numeracy issues for Australia are not just 'residual' (the result of an aged population missing access to education) or 'relapsing' (insufficient motivation to learn) but also 'relative'—the demands of the workplace now exceed the existing level of literacy and numeracy of the employee (International Labour Organisation 1995; McKenna & Wignall nd; Steele 1994; Wallace 1995). With the recognition that literacy and numeracy are intrinsically linked with workplace changes and the ability of organisations to remain internationally competitive, literacy and numeracy have become integrated with mainstream training, and workplace competencies.

The mainstreaming of literacy and numeracy, while encouraging a more positive and accepting attitude to literacy and numeracy provision, and subsequent improvements in status, teacher preparation and professional development, has not been without some drawbacks (Searle 1999). While the notion of equity remains, there has been a movement away from a social welfare notion of literacy and equity to an 'emphasis on securing individual positional advantage and individual vocational advancement' (Kell 1999, p.8). For Wickert, (1998, p.3) the notion of equity in relation to literacy has become 'conditional on capacity', a human capital approach to equity.

Policy changes, which have been responsible for the perceived mainstreaming of literacy and numeracy provision, are associated with the introduction of the training reform agenda.

the training reform agenda

The training reform agenda, including the introduction of competency-based training (CBT), flexible delivery and recognition of prior learning has had a significant impact on literacy and numeracy provision. However, the nature of the impact is not always consistently evaluated in the research.

The incorporation of literacy and numeracy into industry-based competencies is perceived as being an advancement for the provision of literacy and numeracy (Courtenay & Mawer 1995; Kell 1998; National Board of Employment, Education and Training [NBEET] 1996). The introduction of CBT is cited as one of the main reasons organisations have implemented Workplace

English Language and Literacy training (WELL) (Welch 1998). However, there is a shortage of empirical evidence to support the assumption that CBT contributes to literacy and numeracy acquisition (May 1996) and some criticism of the impact of CBT (Freebody 1997; National Staff Development Committee [NSDC] 1996; Volkoff & Golding 1998a).

The critics claim that CBT reinforces a return to a functional definition rather than a social definition of literacy (Searle 1999). It is perceived as a reduction of skilful and artful work practices into isolated constructs based on what people can do in decontextualised situations (Freebody 1997). Volkoff and Golding (1998a) believe the skill requirement is overestimated in CBT and industries erect unnecessary entry barriers. May (1997) believes that CBT and self-paced learning will increase demands for learning assistance. Some of these issues are addressed in later sections of this review.

Flexible delivery has been one of the main shifts in policy development connected with training reform in Australia throughout the 1990s. During this period the concept of flexible delivery has been defined in terms of a client-focussed approach, reflecting a number of learner-centred attributes of an open learning philosophy (Kearns 1997). A central feature of flexible delivery strategies is the role they play in addressing access to VET for disadvantaged groups such as people in remote locations, those with disabilities and literacy needs, Aboriginal people and particular groups of women. For those with language and literacy needs, flexible delivery for workplaces under programs such as WELL is seen to be advantageous. However, there is limited documentation to draw conclusions about the impact and success of flexible delivery on the development of literacy and numeracy skills. Throughout the research there has been a relative neglect of learning aspects, including the application of adult learning principles (Kearns 1997). The 1996 ANTA National Flexible Delivery Taskforce identified limited access to quality learning support as one of the main barriers to flexible delivery.

competition in VET: the open training market

The introduction of competition between public and private providers was intended to improve client satisfaction while improving training efficiencies. For the provision of literacy and numeracy services, Henry (cited in Volkoff & Golding 1998a) suggests competition in the private training market will reduce private providers' ability to address equity issues. It has been suggested that the move towards outcomes-based funding may make literacy and numeracy students less attractive to private providers. However, no hard evidence exists to support this.

There has been very limited research in the area of user choice and its impact on literacy and numeracy. New apprenticeships and user choice are perceived as placing 'even greater dependence upon the operative's literacy/numeracy skills' (Whitaker 1998, p.2). However, Selby Smith (1998) alludes to a positive impact of user choice for access and equity clients. It allows customisation to meet the needs of specific client groups, including their literacy and numeracy needs. There is insufficient empirical evidence on which to draw conclusions.

Marketisation has, however, increased demands for teachers to be: skilled brokers, able to negotiate and sell educational products, manage projects, map existing resources, and customise packages (Kell 1998). The introduction of the level playing field, the registration of training providers, and the development of competency standards has resulted in a significant increase in workplace training and the diversification of literacy and numeracy training options. Increasingly, literacy and numeracy training is incorporated into workplace training that is delivered on site either by the enterprise, or in partnership with specialist literacy and numeracy providers. This has resulted in the development of the enterprise-based literacy and numeracy teacher, a challenging new role. There has also been debate over the roles of content specialist and literacy specialists with the provision of more integrated approaches to training.

competition, collaboration or integration of emerging teacher roles?

In recent years the roles of literacy and numeracy specialists, general vocational educational trainers and industry trainers have changed. What is not apparent to these practitioners, is the exact nature of the changed roles. Certainly there is evidence to suggest there is a reluctance of staff to accept some of the new roles. Dillow (1997) has called for role definition and clarification.

Improvements have occurred in the training and certification of literacy teachers, recognising the professional specialisation in this field (Searle 1999). At the same time, there has been a development in the expectation that all trainers have a role to play in the identification and management of literacy-related issues (NBEET 1995). These roles need not represent a conflict, but many staff find the question of responsibility for students with literacy and numeracy difficulties to be problematic. Content knowledge specialists often believe that literacy and numeracy is not their responsibility nor are they adequately skilled in these areas. At the same time, literacy specialists are perceived as lacking the necessary content knowledge or technical skills to be of assistance to students in vocational courses. The reality is that there has been a blurring of roles (Gilding 1996).

Adopting an integrated approach assists in resolving the problem of how to bridge the gulf between literacy and numeracy specialists and other trade and industry trainers (May 1997). It reduces the sense of competition between staff by promoting a collaborative approach to the ownership and management of literacy and numeracy issues. Team teaching is one of many useful strategies (Watson & Harrison 1998a, 1998b) which may assist non-literacy specialists to develop the skills needed to recognise literacy issues (Black 1996). Strategies are available to overcome the difficulties, but the underlying conflicts between staff need to be clearly and carefully resolved.

For literacy and numeracy specialists the development of work-based training has placed new demands on skill levels (Kell 1998). The role of enterprise-based trainer is a challenging one. Maclean (1999, p.12) states that the:

> *literacy teacher is no longer the autonomous individual of adult learning or andragogy theory, but a team player, part of a network of employers, trainers and community workers. She is concerned not only with the learner, but with the learner's literacy context, working to ensure a fit between the two which initiates a process of ongoing change in a learning culture.*

The role of literacy and numeracy teachers in the workplace requires the following roles (Kell 1999; McCulloch 1997; Watson & Harrison 1998a; Wignell 1998):

- workplace trainer
- consultant with liaison and negotiation skills
- project manager
- team teacher
- interpreter of standards
- professional teaching adviser—giving support for other VET trainers
- professional development facilitator
- assessor adviser
- developer of customised training
- developer of resources for assessment
- entrepreneur with political skills
- industry specialist and resource.

These skills and duties embedded in these roles call for additional professional development that needs to be considered in the pre-service training of teachers.

training packages

The impact of training packages on literacy and numeracy is the most significant recent development. As yet, it is too early to determine the nature of this impact. Research and resource development programs are currently in progress. Extensive monitoring and research will be necessary over the next few years.

Kell (1998) believes that training packages will result in the teaching of literacy and numeracy becoming decontextualised. There will be further changes to the role of the literacy and numeracy teacher (Wignell 1998). There is a question of how literacy and numeracy issues will be managed. In order to deliver training packages, will training providers be required to demonstrate competence in literacy and numeracy issues?

The emergence of literacy and numeracy as a central policy issue and the integration of literacy and numeracy provision within vocational education and training and within industry has developed significantly over the last thirty years. During this time, perceptions and discourses surrounding literacy have transmuted from welfare and equity issues, dealt with on the margins, to national economic imperatives embedded in the national VET system and workplaces. While there is no definitive stance on the most recent initiatives, the literature provides some evaluation of the overall performance of Australian literacy and numeracy policy development. However, as stated earlier, there are concerns surrounding the effectiveness of training packages for learners with low literacy and numeracy skills.

an **evaluation** of policy

Despite the prolific policy development, this area has witnessed the release of eight major policy statements in the last ten years (Lo Bianco 1998). Australian policy development is viewed as problematic and unsuccessful in reducing the size of the literacy problem in Australia. McCulloch (1997) describes the current policy context as being in disarray, beset by contradictions, tensions and conflicting interests. This is despite substantial funding and continuous attention to policy. According to the Australian Bureau of Statistics 1997 survey, there has

been little or no reduction of the incidence of adult literacy problems, nationally from the 1980s. Policies have marginalised some groups of learners, favoured some settings and imposed bureaucratically convenient modes of assessment (Lo Bianco 1997a, p.22).

The Australian Bureau of Statistics *Aspects of literacy* survey suggests that the Australian Language and Literacy Policy of 1991 has not had a significant impact. A reinvigorated national policy is needed, but one based on input from practitioners and students:

> *The SAL provides compelling statistical evidence of adult literacy problems and sufficient justification for a comprehensive national program of literacy planning and basic education for adults. The survey amply justifies the need for an overarching policy that specifically addresses literacy.*
>
> (Lo Bianco 1997a, p.87)

Lo Bianco is currently developing a new policy.

Observations made by Welch (1998, p.23) about the wider field of research, that 'research in VET [is] fragmented and that links between research and policy and practice are weak' hold true for literacy and numeracy research. The impact of research is described as indirect, delayed, making only minor contributions individually, but a major contribution collectively (Selby Smith & Selby Smith 1998). The most significant impact of research on policy is through raising awareness and enhancing acceptance of ideas.

Rather than informing policy development, the research generally examines the impact of policy, explores developments consistent with policy direction and is utilised to develop resources and professional development consistent with current policy. Research findings evaluate policy decisions rather than informing them. Campbell and Wilson (1999) call for research to examine how policy is being influenced by research findings, particularly in relation to the *Aspects of literacy* survey. This persistent resistance to take into account understandings of literacy through field research contributes to an absence of informed public debate (Lee & Wickert 1997). Clearly the links between research and literacy and numeracy policy could be tightened.

the **impact** of literacy and numeracy levels **on participation** in VET

One of the most obvious ways of measuring the success of policy initiatives is through a consideration of participation rates. This is a difficult area for literacy and numeracy research. Some of the difficulties of accessing and interpreting accurate information about participation rates will be considered before examining the available research findings.

the **difficulty** of **measuring** or **evaluating**

Research papers specifically examining the impact of low levels of literacy and numeracy on participation rates were scarce. While participation rates in training are measured for targetted groups frequently associated with low levels of literacy and numeracy, the literacy variable is not included in the available statistics (Watson & Harrison 1998a). Studies in the broader area of student attrition do not specifically identify literacy and numeracy issues (Uren nd). While module completion rates are available, it is impossible to make assumptions about causal relationships without qualitative data or more specific quantitative data to corroborate the information. Difficulties have been experienced with access to data through the Australian Vocational and Education Training Management Information System. According to UNESCO (1997, p.14) 'a better information base with better knowledge of what works, with whom and in what context, is the pre-requisite for developing sustainable literacy policies'. Currently, the Australian system lacks this pre-requisite.

In order to be able to identify the impact of low literacy levels it is essential to clearly establish the actual levels of literacy and numeracy of students. Accurately establishing levels of student literacy and numeracy is often difficult

(Bates 1997). Students' literacy and numeracy levels are frequently unknown at the commencement of training and students experiencing difficulties may not become apparent to staff during the course of training (Whitaker 1998). This may be due to factors associated with teacher knowledge, practice and skill, student confidence and self-esteem and training delivery models. For whatever reason, literacy and numeracy difficulties often remain a hidden factor, concealed by absence, attrition, motivational issues or failure in other aspects of the training.

Students requiring literacy and numeracy support are too frequently identified a substantial time after the commencement of training (Whitaker 1998). While the need may become apparent through self-disclosure by the student or through continuous assessment processes, commonly the situation is uncovered through teacher intuition, observation and perception. These are unsatisfactory substitutes for accurate information being available to the trainer at the commencement of training. There is a need for rigorous quantitative and qualitative data.

Despite a lack of data about the extent of literacy and numeracy problems, solutions and strategies for improvement are often proposed. This loose coupling of concerns and solutions presents a serious difficulty for this review. An identified solution suggests that some barrier to participation is believed to exist, but the exact nature of the barrier is not identified. Can it be assumed, for example, that staff development literature proposing programs to improve literacy awareness and training has based this need for assistance on the identification of a problem? How has this need actually been established? This piece of the research jigsaw puzzle appears to be missing.

Developing teaching strategies relying on unsubstantiated information can be quite erroneous. For example, the Workers Education Association, Illawarra project, (Adult and Community Education South Coast 1996) assumed that the initial success of their retention of adults from community classes to accredited classes could be attributed to student familiarity with the lecturer. This finding was based on anecdotal comments from students. However, further evidence suggested that it was, in fact, attendance at the community class which facilitated the continuation of students, not the familiarity with the lecturer.

Loose coupling of concepts also occurs between variables such as disadvantage, equity and unemployment. It is difficult to identify the exact role or relationship of literacy and numeracy with the other variables, where this is not explicitly stated. Similarly, terms are used loosely in the research. An issue

identified as impacting on student participation may be a lack of sufficient skills (Volkoff & Golding 1998b). It is unclear whether this phrase refers to a lack of content knowledge, a lack of content-based skills or a lack of communication or literacy skills.

Considering the above concerns, the remainder of this section examines participation in relation to literacy and numeracy in two distinct areas. Firstly, the impact of low levels of literacy and numeracy on success in vocational education and training (VET), and secondly, the identification of barriers related to successful participation.

participation in the workplace **training** environment

The most extensive body of literacy and numeracy research is workplace based. The research is highly contextualised, focussing on industry, enterprise and site-specific literacy and numeracy training issues. The research focusses on the development of competency standards that integrate literacy and numeracy, the development of resources for specific industries and the design of curricula. Many studies are the product of Workplace English Language and Literacy programs and Workplace Language and Literacy in Action programs (Pearson & Strickland 1993; Wallace 1997a, 1997b).

The work of O'Connor (1992, 1993), Lankshear (1994, 1997; Gee & Lankshear 1997; Gerber & Lanskhear 2000) and Mikulecky (1982; Mikulecky & Cousins 1982; Mikulecky & Drew 1991; Mikulecky, Ehlinger & Meenan 1987; Mikulecky & Lloyd 1993; Mikulecky, Lloyd, Kirkley & Oelker 1996; Mikulecky & Strange 1986) have impacted on the way in which workplace literacy has been understood and developed. Other work that has been conducted emerges from the Centre for the Study of Education and Training based at Lancaster University in the United Kingdom. In particular the work of Frank and Hamilton (1993) explores a variety of issues including the role of ABE within the workplace; the benefits of literacy provision in the workplace (Frank & Holland 1996); the 'learning journey' of students who had undertaken workplace literacy five years previously (Frank 1996). Discussion is provided as well as some evaluation of the Workplace Basic Skills Training courses (Frank 1996). Frank and Hamilton (1999) argue for a 'whole person' approach to be adopted with the workplace literacy curriculum and more holistic method to be adopted in addressing the training needs of people within the workplace.

Despite the extensive research base the question of the literacy productivity nexus remains contentious. Some argue that the literacy productivity nexus is accepted uncritically although it remains unproven (Corcoran et al. 1996; Searle, Smith & Cochrane 1996; Somerville 1997). However, some argue that problems associated with literacy in the workplace cost the nation 3.2 billion per year (Coates, Fitzpatrick, McKenna & Makin 1995; Fitzpatrick & Roberts 1997) and that companies may waste up to two thirds of their training budget because workers cannot benefit from training due to literacy and numeracy difficulties (Welch 1998).

perception of the extent of literacy and numeracy problems

The degree to which literacy and numeracy difficulties are identified in the workforce varies enormously. The *Aspects of literacy* survey (ABS 1997a, 1997b) clearly identifies that people within the workforce have poor literacy and numeracy skills. Overall, 11–12 per cent of people are identified as having skills at level 1. The rate of poor literacy skills, however, varied significantly with occupation groups from 17 per cent for plant and machine operators and drivers, to eight per cent for managers and administrators.

Despite these statistics, industry personnel do not appear to perceive that literacy and numeracy difficulties are extensive. Only four industries identified literacy and numeracy training as a future training need at the *Industry Training Outlook* conference (Curtin 1998; Guihot 1998; Murray 1998; Wheeler 1998). Trainers often fail to recognise literacy as a problem or do not see its relevance to more than a limited number of trainees (Bates 1997).

the relationship between workplace training skills and job requirements

While workers may have sufficient skills to complete the tasks required for their employment, the literacy and numeracy demands of workplace training may preclude them from participation and prevent access to promotion (Courtenay & Mawer 1995; Hull 1997; Mezinec 1998; Searle, Smith & Cochrane 1996; Wignell 1999). Stromback and Preston (cited in Milton 1996, p.123) have noted that 'poor language skills may not have a substantial effect on a person's productivity in a particular job, but make it difficult to acquire further skills to improve that productivity'. This is a problem especially when self-paced print materials are the basis for training.

The time required for the acquisition of skills is often underestimated. Achieving gains in literacy and numeracy takes time. It is a gradual skill

development. Often workplaces expect significant improvements in skills without allocating realistic times to achieve gains (Mikulecky & Lloyd 1993).

print-based self-paced learning resources

A reliance on print-based, self-paced learning strategies and resources in training alienates employees with literacy and numeracy difficulties (Department of Vocational Education and Training 1998; Wignell 1999). This has been identified as a specific issue for indigenous workers who operate primarily in oral mode. Bates (1997, p.5) believes that there is a 'significant lack of awareness of how the language and structure of the training materials, and the assessment strategy prescribed, imposed significant and often unreasonable literacy demands on trainees'. There is often a mismatch between the complexity of written course materials, teaching and assessment strategies used and the entry-level competencies of learners.

the perceived risk of exposing limited skills

Literacy and numeracy difficulties often go undetected because of the personal nature of such information. Disclosure is dependent on the level of trust and rapport between the student and trainer or supervisor, and is most likely to occur where there is an equitable balance of power (Corcoran et al. 1996). This barrier is particularly relevant in the workplace.

Self-disclosure is less likely in the workplace because of fears about employment and career ramifications. Disclosure may result in loss of opportunity for promotion, and potential loss of income. The personal costs of exposure are also high in the workplace. Workers may be ridiculed and experience a loss of respect from colleagues and supervisors (Corcoran et al. 1996; Department of Vocational Education and Training 1998).

critical success factors within the workplace

If we accept that a focus on identifying factors for successful implementation of literacy and numeracy strategies is a corollary to identifying barriers to participation, a review of these factors can contribute to an understanding of significant variables impacting on literacy and numeracy provision. The following factors have been identified as necessary for the effective delivery of literacy and numeracy training in the workplace:

- establishing a need for training (Welch 1998) with clear and agreed goals (ANTA 1997c). The goals should be based on a systematic analysis of on-the-job literacy requirements (Kutner, Sherman, Webb & Fisher cited in Mikulecky & Lloyd 1993) and need to be supported by management (ANTA 1997c)
- marketing of the program in the workplace (Welch 1998). The program needs to be openly and positively promoted to potential participants and the workplace in general
- adopting a non-threatening approach based on openness and trust (ANTA 1997c; Welch 1998)
- utilising a skilled facilitator (ANTA 1997c; Welch 1998)
- providing a suitable training environment—site-based, contextualised, using workplace texts and directly linking instructional materials to job literacy tasks (Kutner et al. in Mikulecky & Lloyd 1993; Welch 1998)
- enthusiastic and committed participants (ANTA 1997c)
- selecting appropriate instructional methods (Welch 1998)
- utilising a group approach (ANTA 1997c)
- including a mix of participants (ANTA 1997c)
- setting aside realistic time (ANTA 1997c)

participation of women in workplace training

The participation of women in literacy and numeracy programs offered as workplace training requires additional consideration (Griffith cited in Milton 1996). Male-dominated industries have received a disproportionate amount of workplace English language and literacy funding (MacDonald 1993). Of 68 workplaces studied by Pearson and Strickland (1993) only four per cent targetted women. Volkoff and Golding (1998a) have noted a lack of employer support for literacy and numeracy training for women from non-English-speaking backgrounds.

However, even when women are offered opportunities to access workplace training the offer is frequently not accepted (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993). Some of the following factors have been identified as influencing women to choose not to participate in workplace training:

- long hours employed in factories (Griffith cited in Milton 1996)
- little opportunity to interact with English speakers (Griffith cited in Milton 1996)
- cultural and social expectations of child-rearing and home duties (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993; Griffith cited in Milton 1996; MacDonald 1993)
- lack of opportunity to access training during paid work time for the self-employed and others in paid employment (Volkoff & Golding 1998a)
- this may be due to a lack of commitment by employers (MacDonald 1993)
- no time to participate in the community (Griffith cited in Milton 1996)
- no knowledge of availability of classes (Griffith cited in Milton 1996)
- subservience to male attitudes (Griffith cited in Milton 1996)
- cost of lost production (MacDonald, 1993) and restrictive work organisation (Mezinec 1998) for NESB
- peer resentment (MacDonald 1993)

Participation in workplace training is affected by a combination of variables directly and indirectly related to literacy and numeracy levels of employees.

participation in VET

A limited number of studies examine literacy in relation to participation in the broad field of VET. Studies tend to focus on client groups identified as disadvantaged or enrolled in entry-level and trade-based courses. There is an absence of research covering a cross section of vocational education courses, especially in higher level courses. The assumption that literacy levels impact only on traditionally marginalised groups, however, can no longer be sustained, in the light of the recent *Aspects of literacy* survey (ABS 1997a).

There is evidence to suggest that low levels of literacy and numeracy skills are associated with low participation rates in VET apprenticeships and pre-apprenticeship courses (Whitaker 1998). Literacy and numeracy has been identified by the Queensland Adult English Language, Literacy and Numeracy Council (QAELLN Council) (1998) as a reason for apprentices withdrawing from

courses. Andrade (nd) identified that improvement in literacy skills was needed by some apprentices to keep up with their cohort, meet the demands of industry and fulfil the requirements of training. The impact of poor literacy and numeracy levels occurs before people reach training. The second most frequently given reason for applicants being regarded as unsuitable for apprenticeship is poor literacy or numeracy skills (Employer and Group Training Company 1997). Rather than identifying and embracing literacy and numeracy problems, employers simply block these potential employees. The specific barriers to participation affecting students in vocational education trade-based courses are discussed below.

entry criteria

The lack of explicit entry criteria leads to the acceptance of students into units for which they do not have the appropriate literacy and numeracy skills (QAELLN Council 1998; Watson & Harrison 1998a). According to Barry Davis and Associates (1996, p.1):

> *the more explicit the entry criteria for literacy and numeracy and the better the fit between these criteria and subsequent VET provision (selection, RPL, learning delivery, and assessment processes) the higher the chance of cost effective and successful participation, and the less wastage in the system.*

Entry criteria needs to match not only the requirements for the job for which the training is intended, but also the literacy and numeracy requirements for the training itself (QAELLN Council 1998).

delayed identification of literacy and numeracy skills

Without the use of literacy placement or selection instruments, trainers at the commencement of a unit do not know the literacy and numeracy levels of students. There is a time lapse between course commencement and identification of literacy and numeracy problems if, in fact, problems are ever accurately identified (Corcoran et al. 1996; Whitaker 1998). There is a need for placement assessment, of some type, to be used. By the time problems have been identified, it is often too late to put in place effective strategies or obtain positive outcomes for the student.

stigma/esteem

There is a personal and social stigma attached to low levels of literacy and numeracy skills (Andrade nd). The issue of self-disclosure has previously been

discussed in relation to workplace training. While the basic issue is the same, some additional findings have been reported in the literature.

Students' previous experiences with intervention may make them feel reluctant to accept support even if offered. Consequently, those students most needing assistance often do not seek it (Salter & Allan 1996). Cultural issues can prevent disclosure of a difficulty. It may be culturally inappropriate to ask questions that may reveal a lack of understanding. Andrade (nd) also asserts that younger and less able students do not access available support for this reason.

classroom factors

Large class sizes hinder the identification of literacy issues (Andrade nd). A quality relationship based on trust, confidentiality and a strong rapport with the trainer are required before literacy issues are likely to be disclosed (Corcoran et al. 1996). This is difficult to achieve in a large class where time for individual interaction is limited and where teachers or learners do not perceive literacy and numeracy issues as core business.

For trade students the provision of literacy and numeracy assistance in a traditional classroom can create discomfort. The physical characteristics of a standard classroom location can be a barrier (Whitaker 1998). Students feel more comfortable in a workshop situation.

models of provision of literacy and numeracy support

The particular model adopted for the provision of literacy and numeracy support may influence the level of participation in that support. While Black (1996) believes that tutorial support models prevent failure and reduce the drop-out rate in VET, models integrating literacy and numeracy support into mainstream programs and classrooms seem to have gained overwhelming support (Courtenay & Mawer 1995; QAELLN Council 1998; Searle, Smith & Cochrane 1996; Wignall 1998). Inappropriate referral to external literacy and numeracy support when this could be provided in class may make students reluctant to participate in such programs. The lack of adequate funding for integrated training, however, makes the use of this model more difficult (DEVET 1998; QAELLN Council 1998).

The use of models of support that separate assistance from normal class time sets up competition for time amongst subjects and students (Andrade nd). There is conflict between time spent on valued practical skills versus time perceived as wasted on literacy and numeracy. This is a perception of lecturers, students and employers.

demands of flexible delivery

The use of flexible delivery materials, particularly with pre-apprentices has highlighted student literacy and numeracy deficits (Whitaker 1998). Flexible delivery places heavy literacy and numeracy demands on students. There is currently a reliance on written documents, with a corresponding decline in access to oral information, which has traditionally been available from face-to-face class delivery. While oral assistance may be available from tutors, accessing this assistance requires confidence and skills. The issue, here, is that the training requirements are more difficult than the task requirements of the course. Students with excellent content or task skills may not participate because they have difficulty with the literacy requirements of the training curriculum.

While literature on literacy and numeracy for vocational education across a range of fields and levels is scarce, there is a more extensive body of literature examining literacy and numeracy for groups identified as disadvantaged. This is consistent with the policy positions from the early 1970s linking literacy and numeracy with disadvantage.

barriers to participation for marginalised groups within VET

While Kell (1999) believes that literacy and numeracy has moved into the mainstream, the research strongly focusses on the literacy and numeracy needs of marginalised groups. In addition to the groups traditionally identified as disadvantaged, such as people from different cultural backgrounds, Aboriginal and Torres Strait Islanders, women, unemployed and disabled, an expanding range of marginalised groups is now being researched. This includes survivors of trauma (Crawford & Lenyk 1998) and the homeless (Castleton 1998). The following section discusses issues relevant to particular marginalised groups. However, it should be noted that at times it can be difficult to separate and isolate literacy and numeracy issues from other factors impacting on these groups.

people from non-English-speaking and different cultural backgrounds

This title amalgamates a diversity of subgroups including people from non-English-speaking backgrounds, refugee clients and victims of trauma. Many issues arising from the literature appear to be similar and consistent despite the differences between groups. Although documentation is limited, attention should be drawn to the decline in the use of NESB as a descriptor of a large group of clients. It is viewed as exclusionary where the focus is on the individual and their inability to

develop literacy and numeracy skills. NESB can only be applied to people that do not have English as a part of their language but has been incorrectly used to loosely include others. Other descriptors being adopted to describe various groups includes 'people from language and cultural backgrounds other than English or 'culturally and linguistically diverse' (CaLD). This is seen to be more inclusive and reflects the multicultural society in which we live. CaLD is not a replacement but an addition to aptly describe the clientele accessing public literacy and numeracy services. Issues relating to NESB clients and training in particular have been reviewed effectively by Volkoff and Golding (1998a).

While the most important barrier to participation for NESB people is difficulty with English language skills (Volkoff & Golding 1998b; Mezinec 1998), a range of other factors limits the ability of students from different cultural backgrounds to equitably participate in VET. The exact nature of the relationship between literacy and numeracy and the following factors is not clearly specified in some of the literature as there is an interplay between associated factors.

There is a lack of recognition and accommodation of different cultural and educational traditions within training (Volkoff & Golding 1998a). Culturally appropriate literacy and numeracy provision is essential and must be reflected in course design, delivery, teaching processes and resources (Corcoran et al. 1996; NSDC 1996; Wilson & Hazel 1998).

There is a lack of learning support. This is a vague term which incorporates access to counsellors and managing motivation, class sizes and the ability of teachers to meet the needs of the learners (Crawford & Lenyk 1998; NSDC 1996). Factors which contribute to student motivation are: perception of learning as valuable, learner's ability to control the learning process, provision of affiliation and approval (Dawson 1993). The specific relationship between the concept of learner support and literacy and numeracy has not been made clear in the research (Crawford & Lenyk 1998; Volkoff & Golding 1998a).

A lack of flexibility becomes a barrier. The use of narrow approaches and inappropriate forms of training delivery, such as a lack of inclusivity and integration of language and literacy within curricula, alienates people from different cultural backgrounds (Mezinec 1998; Volkoff & Golding 1998a). This includes the inadequate availability of training or availability at inappropriate times (Mezinec 1998; MacDonald 1993; North-West Women's Association 1996).

The failure of providers to recognise existing skills and recognise previous training, including professional qualifications, is a further barrier to participation (Mezinec 1998; Volkoff & Golding 1998a). As Kalantzis (Pobega 1993) suggests, people coming into a learning situation bring skills with them including a fully developed language that although it may not be English, it is a language that has with it its own genre and discourse. However, this is not necessarily recognised and the needs of learners from culturally diverse backgrounds are neglected as forms of delivery do not take into account the background from which they are operating.

Ineffective course promotion strategies limit the accessibility of training to people with limited literacy and numeracy skills. Information about training options is not readily available or presented in a format that is accessible (Crawford & Lenyk 1998; DEET & NTDE 1994; Volkoff & Golding 1998a). This limits the ability of people from culturally diverse backgrounds with limited English literacy skills to be aware of programs or courses that are available.

According to Collins (cited in Volkoff & Golding 1998a, p.33), a 'monolingual and mono-cultural approach to the training reform agenda appeared to be the greatest barrier to the chances of access and equity for NESB and ATSI in Australia'. This comment highlights issues surrounding approaches adopted in policy development and the implementation and delivery of educational and training programs.

Aboriginal and Torres Strait Islanders (ATSI)

Issues facing Aboriginal and Torres Strait Islanders in the area of education are distinct from people entering the country with limited English literacy and numeracy skills. Until the 1980s, provision of adequate education and training opportunities in Australia for indigenous people has been far from satisfactory. The social and historic context in which education (amongst other issues) has been provided and the discourse it has been dominated by needs to be taken into account in any discussion of inequities in participation and access to education. According to Smallwood (1995, p.40) 'our culture, values and beliefs are still often seen as being second-rate and not taken seriously'. This is evident in the languages being recognised and taught within educational settings. The teaching of English language and literacy must include recognition and acceptance of Aboriginal English and other non-standard forms of English. A lack of local knowledge (including language) by providers prevents this (Buchanan & Egg 1996).

There have been substantial improvements in indigenous education and training in Australia since the 1970s and early 1980s. Following the commencement of the Aboriginal and Torres Strait Islander Education Policy in 1989 there has been a growth in participation and completion of courses and an increase in the involvement of indigenous people in education decision-making (Robinson & Bamblett 1998). Local involvement in the planning and delivery of training is necessary to respond to specific cultural needs of groups within a particular region (Corcoran et al. 1996). One of the central problems in addressing various indigenous issues has been the lack of indigenous community consultation and involvement resulting in programs that are not relevant to the learners. Strategies implemented to address this problem contribute to the facilitation of participation in literacy and numeracy programs. According to Smallwood (1995, p.40):

> *measures should be developed to promote greater indigenous involvement and self-determination in educational decision making. This involvement should include participation in the identification of needs, allocation of funds and in the development, design and implementation of curriculum ... In many cases they (ATSI educators) know where the problems lie, but they lack the financial resources, opportunity and political muscle to implement the necessary changes.*

Buchanan and Egg (1996) identify various factors that facilitate participation including: acknowledgment of Aboriginal culture and identity; consultation with communities; courses that are culturally appropriate; exchange of learning between teacher and learner; entry tasks that are relevant to student experience; choice and flexibility in assessment; and identification of personal language and literacy goals need to be met. The guiding principles to facilitate participation include involving Aboriginal staff; providing opportunities for learners to study together; inclusion of Aboriginal content in material; displaying cultural artefacts; involvement of communities in course delivery; flexible and appropriate teaching and learning; drawing on student experience; negotiating course requirements and task variety.

Awareness of courses and promotion strategies limit the participation rates of indigenous people. Word of mouth has been identified as one of the most effective course promotion strategies (Buchanan & Egg 1996; North West Women's Association 1996; NSW Aboriginal Education Consultative Group 1994). Therefore community involvement and consultation is vital in the development, implementation and success of programs.

There is a lack of flexibility in the curriculum attributed to the use of competency-based training (Kirkby 1993; NSDC 1996). The emphasis placed on accreditation may decrease access for Aboriginal and Torres Strait Islander people. A more inclusive approach would involve the development of pathways from basic to higher qualifications (Buchanan & Egg 1996).

Although there have been significant improvements in the provision of education and training for indigenous people, there are many areas that need to be addressed in order to achieve equitable access and participation. To improve levels of literacy and numeracy skills within the indigenous community, which are significantly lower than the rest of the population, participation rates need to increase and appropriate strategies adopted to achieve this goal.

women

The barriers to participation in VET for women have been the subject of a number of studies (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993; DEET & NTDE 1994; ; MacDonald 1993; North-West Women's Association 1996). Literacy and numeracy issues are difficult to isolate from others associated with access and participation. Significant factors impacting on participation that have been identified are briefly discussed below.

The risk of exposure is due to low self-esteem and embarrassment (MacDonald 1993; Milton 1996). This is exacerbated by past negative experiences of learning or lack of experience in education (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993; Milton 1996).

There is a perception that the available training is irrelevant and inappropriate to the needs of women (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993; North West Women's Association 1996). This view may be encouraged because of the lack of information available on training options. There is also a lack of recognition of existing skills (MacDonald 1993).

Associated issues include a lack of support for learning at home (Milton 1996) the difficulties of family commitments and lack of childcare facilities (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993; MacDonald 1993; Migrant Workers' Centre & UTLC Working Women's Centre 1991; Milton 1996; North West Women's Association 1996). In addition, time constraints or inconvenient timing to suit family responsibilities was

an issue (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993; MacDonald 1993; Milton 1996).

unemployed

Low literacy and numeracy skills are highly correlated with unemployment. People with poor or very poor literacy have a 16 per cent unemployment rate compared to a four per cent unemployment rate for those with very high levels of literacy (Peoples 1999). According to Volkoff and Golding (1998b, p.66):

> *long term unemployment and low literacy, numeracy, and social skills ... are such debilitating factors that they act, irrespective of other categories on all VET participants ... A participant survey ... identified ... a lack of sufficient skills or background knowledge as the most important barriers to participation and completion.*

However a causative link is not clear. The 1998 Australian Bureau of Statistics survey (Peoples 1999) suggests that only 19 per cent of the working-age population cope with the literacy and numeracy requirements of everyday life.

The literacy- and numeracy-related barriers to participation that have been identified include: the complexity of current referral and screening practice, the restrictive eligibility requirements, the length of course and time commitment required, the requirement of non-voluntary participation and the need for access to counselling (McKenna 1999). Black's (1995a) research focusses on the perceptions of jobseekers undertaking literacy programs. Anecdotal evidence suggests that the needs and dispositions of unemployed people vary from adult literacy student groups located in TAFE settings. Under the mutual obligation arrangements, participation in literacy programs is mandatory. Black (1995b) argues that this can be interpreted in terms of power relationships as low literacy and numeracy levels continue to be blamed for jobseekers' failure to find a job whereas in actual fact, the number of jobs available is limited.

disabled

Barriers to participation for people with special needs include: poor linkages between rehabilitation providers and literacy providers, inadequate knowledge of clients' special needs by providers, out-dated information and program development (Love, Ryan & Clark 1992 cited in Corcoran et al. 1996), inappropriate class sizes, lack of appropriate multimedia resources and inadequate level of funding support (McGlynn 1998). To ensure equitable access to literacy and numeracy learning facilities for those with special needs, barriers identified need to be overcome.

participation in adult community education (**ACE**)

ACE providers play a significant role in the delivery of accredited and non-accredited courses in adult literacy and numeracy, adult basic education and ESL programs (Nicolls 1999). The role of ACE according to the Ministerial Council on Education, Employment, Training and Youth Affairs is to:

> *assist the Commonwealth, State and Territory governments in developing a more flexible and competitive labour market, and in developing an informed citizenry and enhancing the cultural vitality of the nation*
> (Campbell & Thompson 1999, p.3).

Four broad areas define ACE including a learner-centred approach, diverse programs, a wider range of providers and ease of accessibility. However, there is no agreed definition in Australia and accepted definitions often include the fact that the provider is community-owned and the needs of the community within the geographic location are met by the provider (Alt & Beatty 1996; Volkoff, Golding, & Jenkin 1999). ACE is perceived as the main pathway into vocational education and training for people with limited literacy and numeracy and attempts to perform this role. Up to 40 per cent of people in pre-employment ACE training have skills below the requirements of workplace learning (DEVET 1998). The paradox, however, is that literacy and numeracy difficulties appear to limit access to and participation in ACE (Campbell & Thompson 1999).

According to Nicolls (1999) the groups that are frequently assumed to be the target of ACE are in fact under-represented. Those least likely to participate in ACE are not in the workforce and have no post-school qualifications. Groups unlikely to participate include the disabled, people from non-English-speaking backgrounds, Aboriginal and Torres Strait Islanders, those with low levels of education and income, unemployed people, the socially or geographically isolated and women. As Sachsse (1999, p.75) states:

> *Participants in adult education are typically characterised by possessing higher levels of income, schooling, occupation, and confidence as well as displaying well-developed social relationships, while non-participants are typically characterised as having low incomes, low levels of language and communication skills and low levels of confidence.*

This suggests that the focus of the sector may be too narrow and is not catering for community members with limited literacy and numeracy skills. However, participation of clients in the adult and community education sector is difficult to gauge accurately as a monitoring and reporting system that is definable

and measurable is not currently available (Nicolls 1999). On a national level, comparisons are problematic due to a lack of reliable data and the different development stages of the ACE sector within each state (Alt & Beatty 1996). These issues combine and contribute to the limited amount of research conducted in the ACE area. Aside from these important research issues, existing barriers that limit participation include the following:

- course fees and other expenses
- inappropriateness of programs offered (in terms of content, location and/or level)
- availability of courses (suitability, timing, distance)
- isolation (geographic, language, institutional)
- program delivery and support
- personal support (course information, child care, transport, money, lack of time)
- low levels of confidence or self-esteem leading to a fear of failure
- rate of achievement
- perception that learning is irrelevant and without value
- negative perception of ACE providers

(Alt & Beatty 1996; Campbell & Curtin 1999)

There is a need for further research within the ACE sector and for comprehensive data to be collected if an accurate picture of participation and attitudes to learning is to be obtained (Alt & Beatty 1996, p.7). With the substantial growth of the ACE sector, areas of research and development have been somewhat neglected and currently there is limited research available (Nicolls 1999; Sheeres 1994).

lack of learning support

For people who may have had negative educational experiences, it is essential that ACE provide a supportive learning environment. A lack of sensitivity to needs (Corcoran et al. 1996), fear of failure (Sachsse 1999), the provision of inappropriate learning support and inattention to the confidence of students as learners will all deter students from participation or continued attendance. Close monitoring of the rate of students' achievement is important (Campbell & Thompson 1999).

class and course characteristics

The characteristics of the course and class provision, must be appropriate to the needs of the learners. This includes small class size (Simmons 1998) and a highly relevant course (Sachsse 1999). A lack of culturally appropriate staff, poor training and negative attitudes have alienated participants (Nicolls 1999). Flexible, better co-ordinated and increased program provision is needed (Corcoran et al. 1996). Programs need to be timed to suit client needs and be accessible (Nicolls 1999).

ancillary services

A lack of carers, transport and childcare were all identified as barriers to participation (Corcoran et al. 1996; Nicolls 1999). Clients are unaware of the services available because of poor access to information (Corcoran et al. 1996; Sachsse 1999). Additional factors include geographic isolation, language and institutional factors (Campbell & Thompson 1999) and cost (Nicolls 1999).

effective **approaches** to the **delivery** of literacy and numeracy **support**

From the research it would appear that the literacy and numeracy skills of students continue to be a barrier to participation in all areas of VET. It is difficult to obtain a clear picture of the extent of the impact of literacy and numeracy on participation because of the lack of research focussed specifically on this issue. The findings are also difficult to synthesise because of a lack of definition and clear identification of variables in the research. There is still scope for extensive research in this area.

More substantial conclusions can be drawn regarding effective approaches to literacy and numeracy provision. Consistent and clear findings have been identified in the research, supported over a wide cross-section of student groups and across training sectors. The research provides clear direction for desirable approaches to the provision of literacy and numeracy training. An integrated approach is being advocated for the delivery of literacy and numeracy, utilising team teaching and contextualised learning. This will be enhanced with the use of customised resources. The teaching and learning skills need to be matched with the demands of job-related skills. Flexible delivery options, including information technology, are advocated and reliance on print-based resources is to be avoided. Early identification of existing literacy and numeracy difficulties and an understanding of cultural issues impacting on appropriate provision will underpin the effectiveness of any delivery.

Literacy and numeracy tuition has been provided through a range of models (Vaughn 1997): bridging, end-on and parallel (Courtenay & Mawer 1995; Salter & Allan 1996; Searle, Smith & Cochrane 1996). While there is support for the use of 'drop in' models (Salter & Allan 1996) there is criticism that 'remedial literacy instruction' is unsuccessful (Searle, Smith & Cochrane 1996). The models

receiving overwhelming support involve integration and team teaching (Courtenay & Mawer 1995; Gilding 1996; McCulloch 1997; QAELLN Council 1998; Searle 1998; Searle, Smith & Cochrane 1996; Volkoff & Golding 1998a; Watson & Harrison 1998a; Whitaker 1998).

integration of literacy and numeracy into **vocational** and **workplace training**

Courtenay and Mawer (1995, p.2) provide a definition of literacy and numeracy integration:

> *Integrating English language, literacy and numeracy into vocational education and training involves concurrently developing language, literacy and numeracy and vocational competence as interrelated elements of the one process. This involves designing and delivering programs which meet the skills needs of the job or occupation and which are responsive to the diversity of learners needs and resources.*

Integration ensures that literacy and numeracy skills are developed in a specific workplace context, and linked to relevant on-the-job skills, utilising appropriate resources. It allows employees and trainees to access support without needing to openly disclose literacy and numeracy difficulties (DEVET 1998).

Purcell and Cielens (1998) and ANTA (1997c) have identified program characteristics for successfully utilising integration. Successful programs will:

- identify and address literacy and numeracy competencies for work performance
- recognise the literacy and numeracy competence of learners
- ensure the literacy and numeracy processes used in training are consistent with job requirements
- ensure that assessment of literacy and numeracy outcomes occurs on relevant vocational tasks

The concept of integration is supported by policy and research (ANTA 1998c; Wignall 1998). The National Board of Employment, Education and Training [NBEET] (1996) endorses inclusion of explicit literacy and numeracy statements as part of industry standards rather than the use of implicit models. Gilding (1996), however, advocates the need to maintain discrete provision as well as develop integration. Gilding sees the policies as serving different needs and interests, not as mutually exclusive approaches. Integrated teaching of literacy

and numeracy poses a dilemma for both literacy and numeracy specialists and general VET and workplace trainers. Team teaching is one approach that can help the integration while promoting professional development.

team teaching

Team teaching is an approach that is recommended as a strategy to assist with the implementation of integration. Black (1996) identifies team teaching as the preferred method of provision of literacy and numeracy support. Team teaching is defined as 'where two or more teachers plan, teach and evaluate a segment or a whole lesson for a group of students' (Riley & Daley cited in Black 1996, p.23). A team teaching approach may utilise the skills of a literacy and numeracy specialist, working with a content area specialist.

The advantages of team teaching as perceived by students are that it:

- benefits all students in the class
- allows difficulties to be addressed at the point of need and in context
- provides opportunities for immediate feedback
- provides demonstrations of independent learning strategies
- provides opportunities to develop skills in asking questions and clarifying information
- provides an advocate for the learner's need (Salter & Allan 1996)

The advantages of team teaching as perceived by teachers are that it:

- enables teachers to develop professionally shared expertise
- enables vocational education teachers to gain insight into the literacy and numeracy needs of students
- enables vocational teachers to gain knowledge of English as a second language and adult basic education methodologies and how to integrate them within the VET context
- provides opportunities for collaboration
- provides the reward of team effort and shared success (Salter & Allan 1996)

Team teaching combines the strengths of the literacy and numeracy specialist with the content and skill based knowledge of the vocational specialist. It provides an opportunity for the modelling of literacy and numeracy methods, a collaborative approach to teaching and opportunities for action research.

contextualised and **customised** literacy and numeracy **provision**

Discourses that accept literacy and numeracy as social practice emphasise the contextualised nature of literacy. Training provision needs to take place in the direct context, or a context recreated as closely as possible to the real environment (Falk 1996; Wignell 1999). Learning in one context needs to be scaffolded into other contexts (Falk 1996). Contextualising literacy and numeracy training improves the relevance of the material to students and enhances motivation (Searle, Smith & Cochrane 1996).

The literature reveals that the concept of transferability of learning over-simplifies the process of learning. The ease with which generic competencies can be transferred into different workplace environments has been questioned (McCulloch 1997). Consequently, contextualised learning is favoured.

An essential component of contextualising training is the customisation of resources and assessments. Kell (1999) has identified marketisation as a driving force behind the demand for customisation, which is sometimes perceived as a problem for providers (Barry Davis & Associates 1996). Workplace literacy and numeracy resources need to be customised to the specific requirements of the workplace (Babalis 1998). This may be easier to achieve with the use of on-line rather than print-based materials (Purcell & Strempl 1998). However, such solutions may require additional literacy skills. A significant body of research and literature has been prepared on the process of customising existing resources or generating new resources to meet the needs of specific workplaces (Babalis 1998; Hummel 1998; Wilson 1996). Teachers will need to develop the skills required to customise materials (Wignall 1998).

matching of **skills** for learning and on-the-job **tasks**

There is recognition that a mismatch occurs between the literacy and numeracy needs of the workplace or occupational tasks and the demands of literacy and numeracy skills required to complete VET (Bates 1997; Department of Employment, Vocational Education and Training 1998; Searle, Smith & Cochrane 1996; Mezinec 1998; Wignell 1999). Any mismatches need to be identified so that instruction can be modified or assistance given with the necessary learning skills (QAELLN 1998; Searle 1998).

The mismatch of learning skills is particularly evident where the learning tasks are print based and limited opportunities for face-to-face assistance are provided. The assessment strategies may also impose unreasonable demands on the learners (Bates 1997). This impacts most on indigenous workers and those from non-English-speaking background who primarily operate in oral modes (Wignell 1999). Watson and Harrison (1998a) perceive this to be a factor contributing to attrition in courses. Alternative flexible delivery options are needed, including information technology.

information **technology**

Information technology has been trialled and developed to meet the literacy and numeracy needs of a range of client groups. There is a proliferation of research into the development and trialling of a range of information technology resources (Babalis 1998; Bray 1998; Le, Le & Ceperkovic 1998; McGlynn 1998; Moon 1998; Pobega 1999; Purcell & Strempl 1998; Wilson 1996), yet gaps exist in the market, especially for specialist clients. According to McRae (1998) there is a real need for multimedia-based initial literacy and numeracy resources for people with disabilities. The research suggests technology can be successfully utilised with most groups of students, if the resources are applied and supported in an appropriate teaching environment (UNESCO 1997).

One of the advantages of multimedia technology is that it can be utilised to overcome some of the resistance of workers to language and literacy programs. The barriers it has been identified as overcoming are:

- apathy of workers (Wilson 1996)
- resistance to classroom set-up (Wilson 1996)
- apprehension about exposure (Babalis 1998; Wilson 1996).

The use of multimedia information technology can reduce the time away from production (Wilson 1996), increase the interest level of all students (Babalis 1998; Bray 1998; Pobega 1999) and improve accessibility to appropriate training and support (Babalis 1998; Sachsse 1999).

The availability of new technology imposes the need for effective staff development to enable staff to understand and utilise the technology and resources effectively (Bray 1998). According to Lepani (cited in Kell 1999, p.10):

'new technologies of learning are emphasising a more complex notion of learning facilitators and knowledge "navigators" to work in settings where learning is conducted at the enterprise and in "cyber-classrooms"'.

According to Le, Le & Ceperkovic (1998) the principles of effective development for online teaching materials include:

- friendliness
- motivation
- purposefulness
- curiosity challenging
- reinforcement
- humour
- interactivity

flexible delivery

Flexible delivery has been used as a strategy to address the special needs of disadvantaged groups, including people in remote areas, migrants (Babalis 1998; Hague & Harris 1996) Aboriginal and Torres Strait Islander people (Robinson 1998) and people with disabilities (McGlynn 1998). It has been recommended for use in the workplace (Mikulecky & Lloyd 1993) and the provision of ACE (OECD cited in Nicolls 1999). While a range of pilot studies have demonstrated the success of the strategies, the extent to which such strategies have been applied is unknown (Kearns 1997).

While flexible delivery strategies are recommended, traditional print-based, self-paced learning materials can compound the literacy and numeracy problems of students rather than facilitating their skill development. There is concern that the level of literacy required to utilise self-paced training materials may be higher than the literacy requirement of the job (Smith, Lowrie, Hill, Bush & Lobegeier 1997; Wignell 1999). Further, there is a 'need to be assertive in seeking assistance when working through self-paced materials' which may not be appropriate for learners lacking in self-confidence (Smith et al. 1997 p.95).

Many teachers, trainers and curriculum writers are poorly prepared to implement flexible delivery strategies (D'Agostino, Palfreeman, Quill, & Ward 1995) and have little knowledge of the special demands flexible delivery may

have on students with literacy and numeracy difficulties. Vaughn (1997) identified the main literacy problems in learning materials for flexible delivery:

- volume of information—unable to get an overview
- introductions are too long
- excessive repetition
- text fragmentation
- sequencing
- integration of relevant with irrelevant
- excessive formality
- confusing layout
- inclusion of more detail than is necessary
- ambiguous activities and exercises
- unclear assessment

From the research, clear information is available about the skills and approaches that are necessary for the effective support of learners experiencing literacy and numeracy difficulties. The development of these skills becomes important through the initial teacher training and ongoing professional development available to teachers and trainers.

culturally **appropriate provision**

For all students it is important that literacy and numeracy training is culturally sensitive (Commonwealth State Council on Non-English-Speaking Background Women's Issues 1993; DEET & NTDE 1994; Kirkby 1993). For marginalised groups, it is essential that the training reflects an understanding of the specific environmental, family, cultural and vocational contexts of students (Wilson & Hazel 1998).

The National Staff Development Committee [NSDC] (1996, p.34) has recognised that:

> *Indigenous people world wide are questioning the value and appropriateness of the adult education that is offered to them. They consistently seek an approach which supports the learner's first language, respects and uses the learner's culture and places the learning of literacy and other basic skills in the context of what individuals and groups express as their needs.*

Action-based, negotiated learning is recommended (NSDC 1996). This contributes to a sense of ownership and commitment to the learning process and increased relevance of content and methodology.

the **importance** of early **identification** of literacy and numeracy **skills**

All of the above approaches can only be effectively implemented when literacy and numeracy difficulties are promptly identified. There is a call for more accurate information about the literacy and numeracy skills of students at the commencement of courses (May 1996; Whitaker 1998). There is a range of ways in which such information can be obtained, each with its own limitations. This is a significant problem for teachers.

Given that self-disclosure is only likely to occur in the context of trust and rapport, it is difficult to voluntarily elicit accurate information from students at the commencement of courses. The most obvious alternative is pre-course 'testing'. However, the fear of the testing situation can deter students from even enrolling. Individualised interviews, which are seen as a positive way of determining what students are able to do, are used in some literacy specific programs (McHugh 1994), but interviews are expensive in terms of teacher time.

With the integration of literacy and numeracy teaching it becomes vital that mainstream vocational education teachers have sufficient knowledge of literacy and numeracy difficulties in order to identify them. QAELLN Council (1998) advocates the need for awareness sessions for on-the-job trainers and employers. However, where this strategy has been tried, there has been a significant lack of interest by staff.

professional development and vocational teacher education

Adult literacy and numeracy teachers come from diverse backgrounds with vastly different levels of qualifications and experience. The minority has specialist qualifications gained from pre-service or postgraduate studies. Others have extensive experience in adult education or related educational fields (secondary or primary education). Still others have limited educational qualifications or experience, and are working primarily in the capacity of volunteer tutors (NBEET 1995).

The central conundrum for literacy and numeracy teacher development is how to develop a specialist field of practitioners while also creating a literacy and numeracy knowledge base in all VET teachers and industrial trainers. While these aims are certainly not mutually exclusive, simplistic positions adopted by some teachers may make the arguments appear so. Calls for all teachers to accept responsibility for literacy and numeracy are often rejected on the grounds that general staff are not sufficiently knowledgeable about literacy and numeracy. Conversely, there is the belief that if teachers speak and write English they have adequate skills to teach literacy and numeracy to others. Clearly, there is a need for both highly skilled specialists and well grounded generalists, but despite calls for the development of understandings of literacy and numeracy for all teachers since the beginning of this century (NBEET 1995) opposition, resistance or apathy remains strong (Andrade nd).

The shortage of highly qualified literacy and numeracy teachers was only realised after the development of the Australian Language and Literacy Policy (1991). Only two universities were providing undergraduate, pre-service education in adult literacy in Australia. By 1995 the number of institutions providing training had increased to eighteen. There is now a range of university providers offering qualifications for vocational education and training staff. New co-operative postgraduate training arrangements provide credit for participation in

VET professional development courses (Mathers 1997). The professionalisation of the literacy and numeracy field is evident in the growth of specialist subjects within undergraduate and postgraduate courses. However, difficulties may arise, for as Sheeres (1997, p.10) suggests:

> *as credentialling creeps ever upwards and courses continue to evolve, the language, literacy and numeracy profession and practices goes on in its struggle to be both specialist enough and broad enough at the same time.*

One of the issues identified as a barrier to teachers gaining qualifications or participating in professional development is the high rate of sessional lecturing staff employed (Mathers 1997). A lack of job security is a disincentive to invest in acquiring additional professional qualifications (NBEET 1995). It is not usual to provide remuneration to part-time staff for attendance at professional development sessions. Participation is seen as an individual rather than an organisational responsibility (Perkins 1997). The introduction of competitive tendering has also encouraged reduction in the investment in professional development (Mathers 1997).

In recent years there has been a decreasing concern with credentials for TAFE teachers (Mathers, Simons, Perkins & Guthrie 1997). While most systems have a salary step linked to the acquisition of a university credential, many VET trainers commence with a trade-based qualification and are provided with an internal basic skills program such as Train the Trainer. Increasingly, these basic skills programs are being replaced by the assessor and workplace competency standards. However, these courses do not provide the skills and knowledge necessary to identify and support students requiring literacy and numeracy assistance. There is a view that, while workplace trainer programs may be appropriate for most sectors of VET, they are seen as inadequate for an institutional setting because they do not provide an understanding of learning theories and instructional design (Mathers 1997).

In the United States the situation is similar. Vocational education teachers are employed on the basis of work experience and suggested work competence rather than on their educational qualifications and experience. According to Frantz, Friedenburg, Gregson & Walter (1996) only 45 per cent of trade and industry teachers have a degree. The figure is less for other vocational fields. The assumption is that work experience and occupational competence are highly related. However, the research suggests that work experience is not related to teaching performance and student achievement. Conversely, the research does

indicate that 'a positive relationship exists between the formal education vocational education teachers receive, their performance in the classroom, and the achievement of their students' (Frantz et al. 1996).

The requirements for entry into the vocational education profession in USA have been increased by the American Centre for National Assessment of Vocational Education. Beginning teachers are required to hold a degree, successfully complete a national competency exam and have work-related experience. These standards reflect the view that it is necessary to 'recruit technically competent individuals with some work experience, but also recognises a well-educated teacher ... as being absolutely necessary to meet the current and future demands of T&I education' (Frantz et al. 1996).

Pre-service teacher education needs to assist teachers to implement reforms, adopt new roles and develop the skills to deal with the diversity of clients (Maclean 1999). Frantz et al. (1996) recommend that teachers should have the skills to administer literacy tests, provide for multicultural instruction, and develop English language skills. It is believed that over the next ten years the role of the VET provider will change significantly from the 'stand and deliver' classroom-based teacher, to richer and more diversified roles of facilitator, researcher, consultant, strategic partner, designer, strategist, manager, communicator, career developer, assessor and accreditation specialist. The mastery of these abilities needs to be provided by pre-service training institutions, but also needs to be made available in postgraduate qualifications and staff development programs.

Wickert (1998) believes that an extensive array of professional development materials are currently available. However, D'Agostino et al. (1995) claimed that there was a paucity of well-documented, formal professional development programs. This may reflect that there has been an improvement in the quantity and quality of professional development resources available, but there still appear to be significant gaps in the programs and the degree to which the available materials are being accessed and utilised. D'Agostino et al. (1995) have summarised the gaps for curriculum developers, industry trainers and vocational teachers. These gaps include specialist knowledge of literacy and numeracy, pedagogical content knowledge and strategies, knowledge of recent developments in delivery models and equity.

literacy and numeracy **needs**

Professional development is needed to help trainers develop the understanding, knowledge and skills required to integrate literacy and numeracy into vocational education and training (Courtenay & Mawer 1995; QAELLN Council 1998; Watson & Harrison 1998a). Currently, there is resistance by vocational lecturers, questioning the need for knowledge and understanding of literacy and numeracy skills. These are perceived as separate specialist skills. It is essential for all vocational education teachers to be able to at least recognise literacy and numeracy difficulties of students (Bates 1997; Black 1996; QAELLN Council 1998). Bates (1997) also argues for the need for wider awareness of the need for plain English. Yet, Andrade (nd, p.12) notes even a 'marked reluctance to participate in proposed literacy and numeracy awareness courses'.

Stereotypical conceptions of literacy and numeracy issues, who they concern and how they impact on teaching and learning prevent the exploration of integrated models of delivery. An understanding of complementary and collaborative approaches, team teaching for example, may help to promote partnerships (Whitaker 1998). There is a lack of awareness of existing training programs and D'Agostino et al. (1995) suggest information needs to be made more widely available.

Staff development modules are available to be utilised for independent professional development or delivery to a group by a facilitator both for specialist and general staff. The National Staff Development Committee (NSDC) (1996) developed a national framework for professional development of adult literacy and basic education personnel. A range of new professional development units and resources were written to improve the professional level of skills of teachers working in the adult literacy area. *A directory of professional development programs and resources for vocational teachers and workplace trainers and curriculum writers* (ANTA 1997b) was developed to overcome the lack of knowledge about available professional development. *Better training* (ANTA 1997a) provides a self-access module specifically designed to assist generalist staff to address English language, literacy and numeracy in VET.

Awareness of cultural sensitivity is important in considerations of literacy and numeracy provision. This is an area where staff need to develop skills (Buchanan & Egg 1996). The NSDC (1996) has identified the need for the design of a staff development module on language and literacy issues for all adult literacy

and basic education staff working with Aboriginal and Torres Strait Islander students.

With a move for more extensive use of technology in literacy and numeracy provision, staff require development in the appropriate and effective use of technology. According to Bray (1998) and Purcell and Strempl (1998) staff need training to improve their own knowledge and skills with the use of technology and to extend their pedagogical knowledge of technology as a teaching tool.

In order to inform personal practice and further the development of theory, practitioners need to develop research skills (Maclean 1999). Action learning research projects have commenced the cultivation of these skills. However, the spread of expertise is still very small in national terms (ANTA 1997c). Action learning skills have been recommended in the *Framing the future* professional development materials (ANTA 1998c) but at present, there is only a weak culture of research amongst practitioners (Selby Smith & Selby Smith 1998).

There is a lack of agreement about the impact of changing policy and practice on the role of literacy and numeracy specialists (Searle 1999). On one hand, there is a perception that literacy and numeracy teaching has become more professional with the introduction of formal qualifications and the use of the National Reporting System (Coates et al. 1995; Kell 1999), while others (Sanguinetti 1999) perceive that the profession is becoming de-professionalised and de-emphasised.

Professional development in the area of literacy and numeracy teaching is crucial to ensure pedagogical issues are understood and addressed and the quality of delivery is optimal. Sheeres, Gonczi, Hager and Morley-Warner (1993) provide examples of good practice in adult education and attempt to provide a form of benchmark against which other courses or training can be measured. According to Wagner and Venezky (1999, pp.24–5) 'a promising form of professional development is one that can engage practitioners in the pursuit of genuine questions and problems over time in ways that alter their own perspectives and practice'.

into the **future:** **directions** for research

There is a need for more research to be undertaken examining issues and areas related to literacy and numeracy. The areas of research include: workplace research; policy research; participation research (concept of apparent, perceived and expressed need); targetted groups; approaches to literacy numeracy teaching; professional development and teacher education; research methodology (more quantitative research required; shift in focus of qualitative research); literacy and numeracy issues in the VET and ACE sector.

According to Freebody (1997) we prescribe rather than describe literacy activities. Certainly this review supports this position. In order to improve literacy and numeracy provision in vocational education and training we need to consider the view expressed by UNESCO (1997, p.14) that 'a better information base with better knowledge of what works, with whom and in what context, is the pre-requisite for developing sustainable literacy policies and may result in increased financing'. So in what ways should future research be shaped to achieve this goal?

There has been a proliferation of research in the literacy and numeracy area, yet, coverage of the field is still fragmented. While workplace literacy and numeracy issues have been most extensively examined in research, the contextualised nature of the research limits the application of understandings to wider enterprise issues. It is the view of the authors of this review that information is gathered quite extensively at a local level, utilised for very specific local purposes but not reported publicly. Localised studies are difficult to access (Selby Smith & Selby Smith 1998). There is a need for further research to fill in the gaps in existing knowledge, and to keep pace with the changing policy issues and their impact.

workplace research

There has been an increase of industry-based contextualised studies of literacy and numeracy over the past decade (Gerber & Lankshear 2000; Mikulecky & Drew 1991; O'Connor 1992, 1993). These studies are consistent with approaches that favour customised, integrated and contextualised literacy and numeracy provision. Somerville (1997) suggests the need for a more critical dimension to workplace studies. Existing studies often focus on the development of processes and resources. It would now be interesting to examine and synthesise the findings from these studies to determine some generic models and approaches for workplace programs. Are there any commonalties with what the different industries are saying? A meta-analysis, which preserves aspects of contextualisation, by examining similar contextual features of the environment, could contribute some interesting findings.

Some of the questions proposed for future workplace research are categorised below:

participants in workplace literacy programs

- Who participates in workplace literacy programs?
- How do workers experience programs?
- How do programs change participation in workplace culture?
- How does culture change as a result of programs? (Somerville 1997)
- Is an individual worker's power increased in the workplace when they learn literacy practices? (Farrell 1998)
- What are the ethnographic impacts on industry-based participants from entry level through to completion of training? (Campbell & Wilson 1999)

power and culture in the workplace

- How do literacy programs impact on industrial relations?
- How do union representatives view literacy for themselves and the workers?
- What part does literacy and numeracy have in workplace culture and negotiation of power?
- How pivotal is the trainer in the operation and negotiation of power in and through literacy programs?

- Where does the commitment of the enterprise-based teacher lie? How does this impact on commitment? (Dillow 1997)
- How do the issues of literacy and numeracy relate to broader issues of change and reform in the workplace?

workplace partnerships

- What are the avenues for partnerships and co-operation to optimise workplace literacy and numeracy? (Department of Employment, Vocational Education and Training 1998)

perceptions of need in workplace literacy

- How do the perceptions of need for workplace literacy and numeracy relate to actual levels of literacy and numeracy in the workplace?
- Are the literacy and numeracy needs of management-level staff sufficient for the demands of their roles? McKenna and Wignall (nd) advocate the use of training packages to promote literacy and numeracy skills at the highest levels. However, the extent to which training packages are utilised to provide literacy and numeracy training at higher levels needs to be examined.

policy research

Areas of new policy development will require examination in research. McCullogh (1997, p.63) argues that 'shifts in literacy policy have been paralleled by the resurgence of economic rationalism in shaping the educational policies of government'. This has impacted on future directions and as such where the research needs to be directed. Currently this should include an examination of the impact of training packages on the delivery of literacy and numeracy in all sectors and the impact of competition. Wickert (1998) has called for research to consider:

- What is the evidence to suggest competitive markets yield more equitable outcomes for literacy and numeracy training?
- What is the evidence that tendering and contracting is more efficient?
- What is the evidence for case management and customisation meeting the needs of adult basic education and the unemployed?

These areas for further investigation are critical in the current policy environment for as Wickert (1998) suggests:

> *the policy edicts from the present ministers of vocational education training and youth affairs can be read as the desires of powerful people who believe*

in the promise that a competitive free market will deliver efficient, flexible and quality training.

The challenge for those involved in the area of literacy and numeracy is to interpret the policy shifts in a manner that enables engagement within both productive and constructive.

participation research

concept of apparent, perceived and expressed need

One of the current weaknesses in the literacy numeracy literature is the lack of clear identification and definition of literacy and numeracy difficulties. Given that self-disclosure of literacy and numeracy difficulties is difficult to elicit, many identifications are based on teacher perceptions, with or without supporting evidence. McNaught et al. (cited in Castleton 1998) provide a potentially valuable conceptual tool for clarifying the examination of literacy and numeracy issues. They have conceptualised literacy as an 'apparent', 'perceived' or 'expressed' need. Each term is defined by McNaught et al. (cited in Castleton 1998, p.71) as follows:

Apparent – estimated from quantitative data sources including population statistics from census data, extrapolations from government department databases and large-scale research surveys

Perceived – interpreted by service delivery agents, researchers, community welfare officers and interested stakeholders, usually qualitative in nature

Expressed – typically obtained from clients or from people with direct access to clients

This nomenclature identifies the source and method used to classify students as requiring literacy and numeracy intervention. This framework allows the parameters of the 'problems' being researched to be more clearly defined. Use of this concept would allow more reliable cross-analysis of data and findings. Current research appears to be predominantly based on perceived need but this is not explicitly stated. Collection of data from all sources would provide a robust base for analysis.

In general, there is a need for research that clearly specifies and defines the variables being examined. A significant gap exists in the area of literacy and numeracy needs and support services in higher-level courses and across a greater

breadth of field. For example, what are the literacy and numeracy needs of students in management-level courses and in areas other than traditional entry-level trade based courses? The adult community education sector seems under-represented in research.

targetted groups

While a significant body of research exists focussing on Aboriginal and Torres Strait Islander and non-English-speaking background groups, there is still a need to pursue research questions which will contribute knowledge to improve the quality of vocational education for these students.

In addition, the research is beginning to examine new groups of students identified as marginalised. There is a need to extend the knowledge base for these groups. Some of the specific calls for future research are listed below:

- identification of groups that are currently marginalised in terms of literacy and numeracy provision (Sanguinetti 1999)
- clarification of student demographics, identification of under-represented students and changing patterns of participation (Brennan 1997)
- Aboriginal and Torres Strait Islander students
  - research approaches that are consistent with self-determination
  - case studies of effective systems of delivery
  - collaboration between institutions and communities
  - outcomes of participation in non-specific Aboriginal courses
  - evaluation of bridging courses and employment programs
  - use of Aboriginal languages in the classroom
  - investigation of community-based provision

  (Buchanan & Egg 1996)

Unemployed people are also another group towards which research needs to be directed, particularly as the impact of mutual obligation policies have not been thoroughly researched. In her experiences, Frischke (1999) found that learners attending mandatory courses were often those that had not been previously successful in educational settings and as such continued to resist the learner role. Recommendations made by Frischke include catering for small learning groups, an integration of VET skills into pre-vocational job-seeker programs, the development of ethical guidelines in programs and recognition of social outcomes in reporting on program outcomes. Granwell (1999) raises issues regarding the financial arrangements for clients of private Job Network agencies.

The report suggests that the cost of literacy and numeracy training that should be borne by private agencies are in fact being subsidised by a State-funded public service. Granwell suggests a clarification of federal and State responsibilities and a need to investigate the real cost of literacy and numeracy training.

VET sector

Concerns have been raised in regards to the literacy and numeracy levels of learners entering the VET sector and participation rates of particular marginalised groups (Volkoff & Golding 1998a;1998b; Buchanan & Egg 1996; Peoples 1999; Black 1995). Much research work is needed to explore the extent of deficiencies in providing literacy and numeracy support, the impact of this on learners and methods of addressing the needs of learners. Other issues relate to the ability of teachers within this sector to provide the necessary support required by particular learners to enhance and develop their literacy and numeracy skills. Professional development concerns are highlighted as the area of literacy and numeracy becomes more specialised, practitioners within the VET sector do not have the specialised training.

ACE sector

As discussed earlier in the report, concerns raised in the ACE sector are related to the lack of participation from clients with low literacy and numeracy skills. Often those with low levels of literacy and numeracy do not form part of the majority of clients that the sector services. There is a need for further quantitative and qualitative research to be conducted to examine participation rates and to determine the ways in which the ACE sector is accessed and utilised by the community. This will assist in policy development and provide a better understanding of ways the ACE sector is able to contribute to the development of literacy and numeracy skills for community members (Alt & Beatty 1996).

approaches to literacy numeracy **teaching**

There are various teaching approaches taken in educational settings with many being applied to suit particular needs of the learners. Some approaches that have been applied in a variety of settings include class-based, work-based, action-based, resource-based, one-on-one, team teaching, collaborative approaches, and

interactive, peer-based, mentoring approaches through to remedial support. Determining the most appropriate approach depends on the setting, literacy and numeracy levels and the needs of the learners. A combination of approaches such as class-based and resource-based may be suitable to learners that are able to attend classes and require additional support to develop and improve their literacy and numeracy skills. Social, economic and cultural factors associated with individual learners need to be taken into account when determining the most appropriate approach.

The whole area of information technology as a tool for the development and support of student literacy and numeracy skills requires further examination. There is growth in the use of technology. However, the research needs to consider the most effective ways that information technology can be utilised and the resources which are most effective for students with different needs. At present, adult literacy programs fall behind in utilising newer electronic technologies for instruction (Wagner & Vvenezky 1999).

professional **development** and teacher **education**

The number of courses in the area of adult education has increased over the past decade. As concerns are raised about levels of literacy on a national basis, more specialised professional development courses are being implemented. Resources such as *Integrating English language, literacy and numeracy into vocational education and training* and *Numeracy in focus*, available through TAFE NSW, provide a framework from which practitioners can develop, design and deliver vocational education and training programs and programs catering for learners with limited literacy and numeracy skills. However, the existence of resources does not guarantee practitioners are undertaking professional development, particularly in the area of literacy and numeracy teaching, nor can we assume the professional development undertaken has an impact on the content and delivery of literacy and numeracy programs. Further evaluative research is required in this area.

Scope exists to examine the uptake of internal and external professional development opportunities to improve understanding and skill development in the area of literacy and numeracy. Continual policy calls for the development of literacy and numeracy awareness and skills have not overcome resistance to this idea. Accessible professional development materials have also had little impact. Examination of the underlying values and attitudes and means of promoting change and acceptance may contribute to knowledge and understanding to assist the process of implementing policy.

research **methodology**

more quantitative research required

Particularly in the area of participation rates, there are calls for more quantitative research (Brennan 1997; Buchanan & Egg 1996; Watson & Harrison 1998a). While many providers maintain detailed databases, this material is not made publicly available or scrutinised for research purposes. Different methods of recording data, across the different vocational sectors, confounds attempts to compare and integrate information. Inconsistent use of terms or a lack of clearly defined variables limits the value of data for higher-level synthesis or meta-analysis. Campbell and Thompson (1999) call for a more systematic approach to data collection. Calls for quantitative research have been specifically made in the following areas:

- documentation of productivity increases (Welch 1998)
- language teaching outcomes (May 1997)
- student demographics
- under-represented groups
- changing patterns of participation (Brennan 1997)

shift in focus of qualitative research

Very few of the research studies examined contained a focus on the experience of literacy and numeracy from the perspective of the student. According to Freebody (1997, p.15) educators and teachers know little about ethnographic accounts of literacy:

> *we are building national curricula, national frameworks and universal assessment and reporting instruments ... with no principled warrant from ethnographies of social literacy practices.*

Somerville (1997) supports the call for inclusion of more participant perceptions in the research.

Lo Bianco (1997a) recommends the use of qualitative research into social practice in combination with ABS-style quantitative studies. Campbell and Wilson (1999) support the call for qualitative research based on a social practice discourse.

emerging trends in literacy and numeracy

There will be continuing debate over the nature of the dominant discourse and its impact and relationship on policy direction. It is unlikely that the differences in discourse will be resolved. However, open acknowledgment of the position of policy makers, researchers and practitioners may make the agenda of research more transparent.

Literacy and numeracy will continue to be a significant policy issue with continuing levels of high unemployment. Literacy, in particular, is perceived as being a barometer of the health and social climate of society (Searle 1999). However, the view that literacy and numeracy problems affect only a limited number of people involved in entry-level training, and in limited industries in the workplace, can no longer be sustained (ABS 1997a). The relevance of literacy and numeracy support, at all levels of training, and across all sectors, needs to be examined and adequately catered for. There will need to be an extension of the application of literacy and numeracy support to a wider range of fields and at higher level vocational and education courses.

Limited literacy and numeracy skills will be an increasing barrier to participation in the workplace. There is likely to be increased use of literacy and numeracy screening as part of the job application process. Employers expect literacy demands in the workplace to increase (Department of Employment, Vocational Education and Training 1998). While those with inadequate levels of literacy and numeracy may be screened out of the workplace, the changing demands of the tasks for those already employed will ensure a continuing need for workplace training.

With the research suggesting that individuals with low literacy and numeracy skills are likely to be under-represented in ACE, the question of how those most in need access the literacy and numeracy support required in order to participate in vocational education and training, remains vital.

The consistency of support for the issues of integration, contextualisation and customisation of literacy and numeracy training is likely to result in further implementation in these areas. The impact of these developments needs to be monitored and evaluated by research.

There is an ongoing need for professional development and changes to initial teacher training to ensure that all teachers have an understanding of the significance of literacy and numeracy issues in training, and an understanding of the different roles of general and specialist staff in supporting students' literacy. There is a need for professional development to assist specialist literacy and numeracy staff to develop the skills consistent with the complexity of their evolving role. In particular, teachers will need to develop team teaching and enterprise-based training skills.

Professional development for staff should assist in the development of effective teaching methods incorporating flexible delivery and information technology. This should include the development of skills to develop resources and support student use of the methods and resources employed. There is likely to be an expansion of the use of flexible delivery utilising information technology for all student groups.

Close examination of the impact of training packages on literacy and numeracy and the development of resources to support training packages will be required as the implementation of this current policy continues.

There is an increasing recognition of student diversity and the need to provide literacy and numeracy training which recognises and values diversity. In order for this to occur, staff require professional development to acquire the skills and knowledge necessary to recognise and value diversity, and to implement culturally sensitive literacy and numeracy training.

The existing interest in literacy and numeracy research needs to be sustained and extended. While a significant body of knowledge exists, there are many gaps to be filled. Stronger links need to be made between understandings gained from research and policy development. It is no longer satisfactory for research and policy to develop side by side, occasionally intersecting. A closer relationship is necessary to ensure that decision making is based on sound theoretical knowledge. Practitioners need to become more actively engaged in the process of knowledge construction by participation in research. The research and data that are currently available at the local level need to be formalised and made more accessible. With these developments it will be possible to have policy informed by research, rather than policy driving research.

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